CLAIMS:

1. An analysis apparatus, in particular a spectroscopic analysis apparatus, for analyzing an object (obj) comprising:
- an excitation system (exs) for emitting an excitation beam (exb) to excite a target region,
- a monitoring system (lso) comprising a monitoring beam source (ls) for emitting a monitoring beam (irb) and an imaging system (img) to image the target region,
- a detection system (dsy) for detecting scattered radiation from the target region generated by the excitation beam (exb),
- focusing means (mo) for focusing the excitation system (exs), the monitoring system (lso) and the detection system (dsy) on a detection plane (dp) in the target region,
- image processing means (ipm) for determining image characteristics, which indicate if the imaging system (img) is focused on the object (obj) to be analyzed, from a detected image, and
- auto-focusing means (afm) for controlling the focusing means (mo) to change the focusing of the monitoring system (lso), the excitation system (exs) and the detection system (dsy) based on the determined image characteristics, for controlling the monitoring system (lso) to image the target region and for controlling the image processing means (ipm) to determine the image characteristics from a detected image until the object (obj) substantially lies in the detection plane (dp).

2. An analysis apparatus as claimed in claim 1, wherein said image processing means (ipm) are adapted for determining the amplitudes of spatial frequencies corresponding to typical characteristics of the object (obj) from a detected image and wherein said auto-focusing means (afm) are adapted for controlling the focusing means (mo) to change the focusing of the monitoring system (lso), the excitation system (exs) and the detection system (dsy) based on the determined image characteristics, for controlling the monitoring system (lso) to repeatedly image the target region and for controlling the image processing means (ipm) to determine the image characteristics from a detected image until the determined amplitudes of spatial frequencies are maximally.

3. An analysis apparatus as claimed in claim 2, wherein said analysis apparatus is adapted for in vivo analysis of blood and wherein said image processing means (ipm) are adapted for determining the amplitudes of spatial frequencies corresponding to typical diameters of blood vessels from a detected image.

4. An analysis apparatus as claimed in claim 1, wherein said image processing means (ipm) are adapted for determining the maximum contrast present in a detected image and/or at one or more image portions corresponding to the object or object portions and wherein said auto-focusing means (afm) are adapted for controlling the focusing means (mo) to change the focusing of the monitoring system (lso), the excitation system (exs) and the detection system (dsy) based on the determined image characteristics, for controlling the monitoring system (lso) to repeatedly image the target region and for controlling the image processing means (ipm) to determine the image characteristics from a detected image until the determined contrast is maximally.

5. An analysis apparatus as claimed in claim 4, wherein said analysis apparatus is adapted for in vivo analysis of blood and wherein said image processing means (ipm) are adapted for determining the maximum contrast present in a detected image between blood and surrounding tissue, in particular at the edges of blood vessels.

6. An analysis apparatus as claimed in claim 4, wherein said auto-focusing means (afm) are adapted for controlling the focusing means (mo) to change the focusing of the monitoring system (lso), the excitation system (exs) and the detection system (dsy) based on the determined image characteristics, for controlling the monitoring system (lso) to repeatedly image the target region and for controlling the image processing means (ipm) to determine the image characteristics from a detected image until the determined the intensity of one or more pixels in the detected image show an extremum.

7. An analysis apparatus as claimed in claim 4, wherein said auto-focusing means (afm) are adapted for controlling the focusing means (mo) to change the focusing of the monitoring system (lso), the excitation system (exs) and the detection system (dsy) based on the determined image characteristics, for controlling the monitoring system (lso) to repeatedly image the target region and for controlling the image processing means (ipm) to

determine the image characteristics from a detected image until the spread in intensity of pixels in the detected image is maximally.

8. An analysis apparatus as claimed in claim 4, wherein said auto-focusing means (afm) are adapted for controlling the focusing means (mo) to change the focusing of the monitoring system (lso), the excitation system (exs) and the detection system (dsy) based on the determined image characteristics, for controlling the monitoring system (lso) to repeatedly image the target region and for controlling the image processing means (ipm) to determine the image characteristics from a detected image until the average intensity difference between neighboring pixels in the detected image is maximally.

9. An analysis apparatus as claimed in claim 4, wherein said auto-focusing means (afm) are adapted for controlling the focusing means (mo) to change the focusing of the monitoring system (lso), the excitation system (exs) and the detection system (dsy) based on the determined image characteristics, for controlling the monitoring system (lso) to repeatedly image the target region and for controlling the image processing means (ipm) to determine the image characteristics from a detected image until the absolute intensity difference between neighboring pixels in the detected image is maximally.

10. An analysis apparatus as claimed in claim 1, wherein the monitoring system (lso) is adapted for orthogonal polarized spectral imaging, in particular for bichromatic orthogonal polarized spectral imaging.

11. An analysis method, in particular a spectroscopic analysis method, for analyzing an object comprising the steps of:

- emitting an excitation beam (exb) by an excitation system (exs) to excite a target region,
- emitting a monitoring beam (irb) by a monitoring system (lso) to image the target region by an imaging system (img),
- detecting scattered radiation from the target region generated by the excitation beam (exb) by a detection system (dsy),
- focusing the excitation system (exs), the monitoring system (lso) and the detection system (dsy) on a detection plane (dp) in the target region by a focusing means (mo),
- determining image characteristics, which indicate if the imaging system (img) is focused on the object (obj) to be analyzed, from a detected image, and

- controlling the focusing means (mo) to change the focusing of the monitoring system (lso), the excitation system (exs) and the detection system (dsy) based on the determined image characteristics, controlling the monitoring system (lso) to image the target region, and controlling the image processing means (ipm) to determine the image characteristics from a detected image until the object (obj) substantially lies in the detection plane (dp).

12. An optical focusing system for focusing on a target point of an object (obj), comprising:

- a target system (exs) to be focused on the target point,
- a monitoring system (lso) comprising a monitoring beam source (ls) for emitting a monitoring beam (irb) and an imaging system (img) to image the target region,
- focusing means (mo) for focusing the target system (exs) and the monitoring system (lso) on a detection plane (dp) in the target region,
- image processing means (ipm) for determining image characteristics, which indicate if the imaging system (img) is focused on the object (obj) to be analyzed, from a detected image, and
- auto-focusing means (afm) for controlling the focusing means (mo) to change the focusing of the monitoring system (lso) and the target system (exs) based on the determined image characteristics, for controlling the monitoring system (lso) to image the target region and for controlling the image processing means (ipm) to determine the image characteristics from a detected image until the object (obj) substantially lies in the detection plane (dp).

13. An optical tracking system as claimed in claim 12, wherein said target system (exs) comprises a light beam generation means for emitting a light beam, in particular a laser for emitting a laser beam, to be focused on the target point of the object.

14. An optical tracking system as claimed in claim 12, adapted for use in the field of laser surgery, laser cutting, laser welding, laser shaving, photodynamic therapy, radio therapy, remote sensing and target and tracking.